Challenges:

One challenge that I faced was implementing the function that parses the distance for vertical line and horizontal line plot commands. I had to figure out how to handle errors as well as how to actually parse the digit one by one. I also had a bit of trouble listing all the conditions for whether a line can be plotted.

Design of performCommands function:

*repeatedly while not at the end of the command string:*

*get current command character*

*if command character is for horizontal line plot or vertical line plot,*

*get distance from parseDistance function*

*return error if command is invalid and track error if line can’t be drawn entirely*

*plot line and adjust current location in grid*

*if command character is for background or foreground mode,*

*raise error if command is invalid or if character to plot is not specified*

*adjust mode accordingly*

*if command character is for clearing grid, clear grid*

*otherwise, raise error because command character is invalid*

*if command string is syntactically correct but line can’t be drawn, return plot command error*

*return that function successfully executed all commands*

Design of parseDistance function:

*raise error if at the end of command string or if the current character is not a digit/’-’ symbol*

*check for negative sign*

*parse first digit*

*parse second digit, if present*

*return distance composed of sign if negative and digit(s)*

Design of plotLine function:

*raise error if the parameters are invalid and if line can’t be drawn entirely in grid*

*calculate how much to subtract/add, if at all, to current column and row for loop*

*for each point on the line:*

*if in foreground mode or in background mode with current grid point being empty,*

*plot point*

*find next point based on subtracting/adding to current column and row*

*return that function plotted entire line in grid*

Test cases:

Exit program (“”)

Draw a vertical line (“v14”)

Clear and reset grid after drawing (“f@v14” “c” “h10”)

Draw a horizontal line with negative distances (“h15v8h-12”)

Draw in background mode (“v10h6f h4b@h-8”)

Draw in foreground mode (“v10h6f h3f@h-6”)

Plot a single point (“v0”)

Plot a single point using double zeroes as distance (“v00”)

Plot a single point using negative zero as distance (“v-0”)

Mixed-case commands (“v10F#h4”)

Multiple command strings (“v14” “f@h4”)

Multiple command strings (“h12V3H-1B@v-3” “v2b h12fHh1fih0”)

Invalid ‘f’ command syntax (“h14f”)

Invalid plot distance -- too many digits (“h188f@”)

Invalid plot distance -- invalid character (“h$1f@”)

Invalid command syntax (“23h12”)

Invalid plot character (“fé”)

Line cannot be plotted entirely to the right (“h50”)

Line cannot be plotted entirely to the left (“h-50”)

Line cannot be plotted entirely upwards (“v20”)

Line cannot be plotted entirely downwards (“v-20”)

Plot command error before syntax error (“v86f”)

Multiple plot command errors (“H28V10H5V86”)